

THE BRITISH SPECIES OF *CARYOCOLUM* GREGOR & POVOLNY

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The Gelechiid genus *Caryocolum* comprises nearly 70 species mainly distributed in the Palaearctic region with a few taxa in the Nearctic. Although the British fauna includes only 12 species, they have often been confused and misidentified in the past. Usually it is possible to distinguish the species by the wing pattern and colour, as well as the colour of head and thorax. Difficulties in determination arise because of the extraordinary variation of individual specimens. In many cases it is therefore essential to examine the genitalia for reliable results. The genitalia structures of the British *Caryocolum* are easily distinguishable by many characters except *alsinella* and *viscariella*. They were figured by Pierce and Metcalfe (1935) who used the standard method of genitalia preparation and arrangement. A technique similar to that recently described by Pitkin (1986) was used for the present study. This explains the difference in the appearance from the figures of Pierce & Metcalfe (1935).

Male and female genitalia of all the British species of *Caryocolum* are figured in this paper, although the aedeagi and signa are not shown.

*Caryocolum* species are univoltine and their larvae feed on various genera of Caryophyllaceae, for example *Cerastium*, *Stellaria*, and *Silene*. In Britain the life history of only one species (*junctella*) is not yet sufficiently known. Caterpillars are usually found in the spring, early instar larvae sometimes from December onwards. Moths are on the wing from late May into September, one species (*junctella*) hibernates as an adult.

KEY TO THE BRITISH SPECIES OF *CARYOCOLUM* (BASED MAINLY ON GENITALIA)

MALES

- 1 Sacculus almost completely reduced ..... *fraternella*
- Sacculus well developed ..... 2
- 2 Saccus slender to moderately broad ..... 3
- Saccus extremely broad ..... 11
- 3 Posterior margin of vinculum with medial and lateromedial incision; valva without apical brush of setae; aedeagus with minute cornuti ..... 4
- Posterior margin of vinculum with medial incision; valva with apical brush of setae; aedeagus without cornuti ..... 7
- 4 Sacculus broad rhomboidal, longer than valva; vinculum narrow ..... *marmoreum*
- Sacculus not broad rhomboidal, shorter than valva; vinculum broad ..... 5
- 5 Sacculus long ..... *vicinella*
- Sacculus short ..... 6
- 6 Forewing 4.0–5.0 mm ..... *alsinella*
- Forewing 5.5–6.5 mm ..... *viscariella*
- 7 Saccus slender ..... 8
- Saccus with broad base ..... 9
- 8 Sacculus with hook-shaped apex ..... *junctella*
- Sacculus without hook-shaped apex ..... *tricolorella*
- 9 Valva short, without apical bulge ..... *blandulella*
- Valva long, with apical bulge ..... 10

- 10 Valva comparatively long, slightly emarginated medially ..... *blandella*  
 — Valva comparatively short, strongly emarginated medially ..... *proximum*  
 11 Posterior margin of vinculum with broad, V-shaped emargination, without lateral process ..... *huebneri*  
 — Posterior margin of vinculum with extremely broad, U-shaped emargination, long lateral process present ..... *kroesmanniella*

## FEMALES

- 1 Eighth segment without folds or processes ..... *fraternella*  
 — Eighth segment with folds or processes ..... 2  
 2 Ductus bursae with pair of lateral sclerotizations posteriorly ..... 3  
 — Ductus bursae without lateral pair of sclerotizations posteriorly ..... 6  
 3 Eighth segment with pair of big, rounded sclerotizations ..... *marmoreum*  
 — Eighth segment without rounded sclerotizations ..... 4  
 4 Antrum funnel-shaped ..... *vicinella*  
 — Antrum reduced ..... 5  
 5 Forewing 4.0–5.0 mm ..... *alsinella*  
 — Forewing 5.5–6.5 mm ..... *viscariella*  
 6 Signum: big hook with additional teeth ..... *junctella*  
 — Signum: moderately small to reduced hook, without additional teeth ..... 7  
 7 Signum: distinct hook ..... 8  
 — Signum: hook completely reduced ..... *kroesmanniella*  
 8 Eighth segment with numerous narrow folds and microtrichia ventromedially ..... *tricolorella*  
 — Eighth segment without narrow folds and microtrichia ventromedially ..... 9  
 9 Eighth segment with pair of long digitate processes dorsally ..... *blandella*  
 — Eighth segment with pair of digitate or flap-like processes ventrally ..... 10  
 10 Ventromedial zone of eighth segment with sclerotized ovate plate ..... *proximum*  
 — Ventromedial zone of eighth segment membranous ..... 11  
 11 Processes of eighth segment long, digitate ..... *blandulella*  
 — Processes of eighth segment short, flap-like ..... *huebneri*

## DESCRIPTION OF SPECIES

*Caryocolum alsinella* (Zeller, 1868), Plate V, Figs 10 and 11

*semidecandriella* (Tutt, 1887)

*semidecandrella* (Threlfall & Stainton, 1887)

Wingspan 8.5–11 mm. Head, thorax and tegulae mid-brown mottled with white, face white. Forewing whitish, flecked with mid-brown; black markings; broad patch from fold to costa at  $\frac{1}{4}$ , spots at  $\frac{2}{5}$ ,  $\frac{3}{5}$ , the latter comma-shaped and extended towards dark brown tornus; markings usually surrounded by orange-brown scales; irregular orange-brown patch distal of cell; white costal and tornal spots at  $\frac{4}{5}$  separated; forewing apex with patch of black scales.

Male genitalia (Fig. 1). Transtilla without spines. Valva long, slender, sword-shaped. Saccus short, thumb-shaped, concave emargination distoventrally. Posterior margin of vinculum with deep medial, shallow lateromedial incision. Saccus long, slender.

Female genitalia (Fig. 13). Eighth segment without processes, two pairs of short ventromedial folds developed. Antrum reduced. Ductus bursae with pair of long lateral sclerotizations posteriorly. Signum with large, stout, strongly bent hook.

Remarks. There is considerable variation in the extent of orange-brown scales; specimens from Britain and Denmark exhibit more of these scales and have therefore been treated as a distinct subspecies (*semidecandrella*) in the past. Moths of a similar external appearance also occur in Southern Europe and so it seems unsatisfactory to give this form subspecific status. *C. alsinella* is very similar to *proximum* externally; it usually differs in the smaller black patch at  $\frac{1}{4}$ . It is distinguished from the similar *junctella* by the head and thorax which are not metallic shiny. The genitalia are extremely similar to those of *viscariella*. *C. alsinella* differs from the latter mainly in the smaller size and lack of orange-brown patches near the dorsum. It seems possible that *alsinella* and *viscariella* are conspecific, although the host-plants and larval feeding behaviour are different. Stainton (1867) illustrates the larvae of *viscariella* as green in colour, those of *alsinella* yellow (as *maculiferella*). According to the original description the colour of *alsinella* caterpillars is light green (Zeller, 1868). Benander (1965) gives the colour of the larva as yellow or green. Further research should be done to solve these discrepancies. Tentatively *alsinella* and *viscariella* are treated as two different species.

Biology. The larva is a leaf-miner in spring (Sønderup, 1949). Later it feeds on spun shoots, flowers and seed-capsules of *Cerastium semidecandrum* L. before it pupates in June (Stainton, 1867). On the Continent the larval stage has also been found on *Minuartia verna* (L.) Hiern (Zeller, 1868) and *Cerastium arvense* L. Adults have been collected from July to the middle of August, abroad from late June to early October. In Britain it inhabits sandy coasts.

Found locally on coasts of England, Wales and Scotland, not recorded from Ireland. Abroad in Europe and Morocco.

*Caryocolum viscariella* (Stainton, 1855), Plate V, Figs 12 and 13

Wingspan 12–14 mm. Head, thorax and tegulae mid to dark brown mottled with a few light scales, face white. Forewing mid to dark brown mottled with whitish; M-shaped dorsum lightened, flecked with orange-brown; indistinct black markings; broad patch from fold to costa at  $\frac{1}{4}$ , spots at  $\frac{2}{5}$ ,  $\frac{3}{5}$  and apex; irregular orange-brown patch distad of cell; white costal and tornal spots separated by orange-brown streak.

Male genitalia (Fig. 2). As described under *alsinella*.

Female genitalia (Fig. 14). As described under *alsinella*, differences in the figures compared with *alsinella* are as a result of individual variation.

Remarks (see also remarks on *alsinella*). The forewing colour of this species varies from distinctly marked to almost unicolorous dark brown. *C. viscariella* differs from the somewhat similar *vicinella* in the extent of orange-brown scales as well as in genital characters such as the shorter sacculus, the posterior margin of the vinculum and the reduced antrum. Small specimens of *viscariella* sometimes resemble *alsinella*, but they usually differ in the two orange-brown patches near the dorsum. The genitalia are indistinguishable from those of *alsinella* and therefore *viscariella* and *alsinella* could prove to be conspecific (see remarks on *alsinella*).

Biology. According to Bradford (1979) the larva occurs from April to June, feeding on a spun central shoot and living in the stem when not feeding. Bradford (1979) gives *Silene dioica* (L.), Clairv., *S. latifolia* Poiret (= *S. alba*) and *Lychnis viscaria* L. as host-plants. On the Continent the larva has been recorded also on *Silene vulgaris* Garcke (Lhomme, 1946). Moths have been collected from early July to the middle of August.

Local in England and Wales, having spread eastwards in a remarkable way in the early 1980s. Abroad throughout Europe except the south-west.



*Caryocolum vicinella* (Douglas, 1851), Plate V, Fig. 14

Wingspan 12.5–15 mm. Head, thorax and tegulae dark brown, face whitish-silvery. Forewing dark brown scattered with a few light scales; M-shaped dorsum whitish mottled with mid-brown, two wedge-shapes across cell at  $\frac{1}{3}$ ,  $\frac{1}{2}$  not reaching costa; white costal and tornal spots at  $\frac{4}{5}$  always separated.

Male genitalia (Fig. 3). Transtilla without spines. Valva long, slender, sword-shaped. Saccus long, broadening medially, concave emargination distoventrally. Posterior margin of vinculum with deep medial, shallow lateromedial incision; lateral lobes rounded. Saccus long, slender.

Female genitalia (Fig. 15). Eighth segment without processes, two pairs of long ventromedial folds developed. Antrum short, broad funnel-shaped. Ductus bursae with pair of long lateral sclerotizations posteriorly. Signum with large, stout strongly bent hook.

Remarks. *C. vicinella* sometimes resembles *viscariella* externally but is easily distinguishable by the lack of orange-brown scales. The genitalia are similar to those of *alsinella* and *viscariella*. They differ in the longer and broader saccus, the posterior margin of the vinculum, the antrum and the distinctly longer apophyses posteriores (2.7 mm in *vicinella*, up to 2 mm in *alsinella*/*viscariella*). *C. vicinella* has often been misidentified as *leucomelanella* in the past. The latter species does not occur in Britain.

Biology. In Britain the larvae have been found in May and June, feeding within spun young shoots and boring into the new stem of *Silene uniflora* Roth (= *Silene maritima*) (e.g. Stainton, 1867). In Scandinavia it also lives on *Spergularia rubra* (L.) Presl. (Benander, 1928) and on the Continent on *Lychnis alpina* L. (Schütze, 1931) and *Cerastium arvense* L. (Pröse, 1979). Moths emerge from late June to mid-July and have been collected until the middle of September. The habitat of *vicinella* is pebbly shores. In the Alps it occurs on screes.

In Britain recorded locally on coasts throughout the British Isles, abroad throughout Europe, except the south.

*Caryocolum marmoreum* (Haworth, 1828), Plate V, Figs 15 and 16

Wingspan 9.5–12 mm. Head, thorax and tegulae light to dark brown, face whitish. Forewing mid to dark brown, dorsal margin greyish-white to mid brown; two triangular whitish patches across cell at  $\frac{1}{5}$ ,  $\frac{1}{2}$  surrounded by black dots, sometimes reduced; white costal and tornal spots at  $\frac{4}{5}$  separated or forming a fascia.

Male genitalia (Fig. 4). Transtilla band-like, without spines. Valva slender, linear. Saccus broad, almost rhomboidal, pointed apex, slightly exceeding valva. Posterior margin of vinculum with two pairs of projections, medial incisions and lateromarginal emargination. Vinculum short. Saccus long, slender.

Female genitalia (Fig. 16). Eighth segment without processes, a pair of large rounded sclerotizations; triangular sclerotizations ventromedially. Antrum reduced, ring-shaped. Ductus bursae with a pair of short lateral sclerotizations posteriorly. Signum with large, strongly curved hook.

Remarks. *C. marmoreum* exhibits considerable variation in the extent of the light forewing markings which are sometimes almost completely reduced, giving those specimens an almost unicolorous appearance. The colour of the head and thorax above shows the same range of variation. The genitalia are easily distinguishable from other British *Caryocolum* by many characters.

Biology. The larva and its life history were described in detail by Stainton (1867); larvae have been found from March into May, feeding on the leaves of *Cerastium fontanum* Baumg. The larval stage lives in a silken tube at the base of the host-plant, covered with grains of sand and it finally pupates in this tube. Moths have also

been bred from *Cerastium semidecandrum* L. in Britain (Walsingham, unpublished records), and *Silene nocteolens* on the Canary Islands (Klimesch, 1984). Adults have been collected from May to September and are undoubtedly univoltine. *C. marmoreum* occurs along sand dunes in Britain; abroad it also lives in pine forests in mountainous areas.

Common on coasts throughout Britain and in the Breck sand district of East Anglia. Abroad in Europe, Morocco, Canary Islands, Canada. Records from Scandinavia and the former USSR are probably misidentifications of *pullatella*.

*Caryocolum fraternella* (Douglas, 1851), Plate V, Fig. 17  
*intermediella* (Hodgkinson, 1897)

Wingspan 11–13 mm. Head, thorax and tegulae light to dark brown, tegulae lighter distally. Forewing dark fuscous, orange-brown across  $\frac{1}{5}$ ,  $\frac{1}{2}$ , patch at  $\frac{3}{5}$ ; black spots distad of cell, the latter usually comma-shaped, extending towards tornus, black markings indistinct; white costal and tornal spots at  $\frac{4}{5}$  separated by orange-brown streak.

Male genitalia (Fig. 5). Transtilla with a few spines. Valva broad, two processes distally. Sacculus almost completely fused with valva. Posterior margin of vinculum with two pairs of indistinct processes, jug-shaped emargination medially. Saccus moderately slender.

Female genitalia (Fig. 17). Eighth segment without processes. Antrum long, tubular. Hook of signum large, stout.

Remarks. *C. fraternella* differs from the externally similar *alsinella* by the extension of orange-brown scales and the separated costal and tornal spots. The male genitalia differ from all other *Caryocolum* in the reduced sacculus.

Biology. The larva feeds in a spun shoot from April to the end of May (Stainton, 1867). Bradford (1979) gives *Stellaria uliginosa* Murray (= *S. alsine*), *S. graminea* L. and *Cerastium fontanum* Baumg. (= *holosteoides*) as host-plants in Britain. Agassiz (pers. comm.) bred this species from *Cerastium arvense* L. On the Continent *fraternella* has been recorded from *Stellaria holostea* L. (Schütze, 1931). Moths have been bred from June to July. It inhabits rough meadows where *Stellaria graminea* grows; adults have been collected mainly in August.

Local in Britain, extending as far north as Dumfries. Abroad in France, Germany, Poland and Scandinavia.

*Caryocolum blandella* (Douglas, 1852), Plate V, Fig. 18  
*maculea* sensu Haworth, 1828

Wingspan 12–14.5 mm. Head, thorax and tegulae white mottled with cream, base of thorax dark brown. Forewing whitish mottled with orange-brown, grey-brown along costa; black markings: broad streak from fold to costa at  $\frac{1}{4}$ , medial spots at  $\frac{1}{2}$ ,  $\frac{3}{5}$ , the latter frequently divided; apex with black spots; white fascia at  $\frac{4}{5}$  often separated by orange-brown scales.

Male genitalia (Fig. 6). Transtilla with numerous minute spines. Valva long, slender, with distinct apical bulge and brush of setae. Posterior margin of vinculum slightly vaulted medially with small incision. Saccus broad at base, gradually tapering.

Female genitalia (Fig. 18). Eighth segment with a pair of broad digitate processes dorsally, ventromedial zone with ovate plate. Antrum short, conical, indented. Posterior part of ductus bursae with sclerotized plate. Hook of signum slender.

Remarks. *C. blandella* bears a superficial resemblance to *blandulella*, *proximum* and *kroesmanniella*. It differs from the former two species in its larger size, from the latter in the more strongly contrasting forewing markings and the black streak at  $\frac{1}{4}$  which is not interrupted. *C. proximum* is also distinguishable from *blandella*

by the darker head colour. The male genitalia of this species are somewhat similar to those of *proximum* but differ in the distinctly longer and broader valva and the broader uncus.

**Biology.** The larva feeds on *Stellaria holostea* L., in the early spring as a leaf-miner, later between spun shoots and finally within the seed capsules. It is fully grown in early June (Douglas, 1852; Stainton, 1867). Moths have been collected from early July to mid-September, particularly in deciduous forests.

Local in England, Wales and Ireland as far north as Cumbria. Abroad in Europe, except the southern part.

*Caryocolum proximum* (Haworth, 1828), Plate V, Fig. 19  
*maculiferella* (Douglas, 1851)

Wingspan 9–11.5 mm. Head, thorax and tegulae mid-brown mottled with white, face white. Forewing whitish, densely speckled with mid- to grey-brown; black markings: broad patch from fold to costa at  $\frac{1}{4}$ , spots at  $\frac{2}{5}$ ,  $\frac{3}{5}$ , the latter comma-shaped; indistinct white costal and tornal spots at  $\frac{4}{5}$ .

Male genitalia (Fig. 7). Transtilla with numerous minute spines. Valva moderately long, slender, with distinct apical bulge and brush of setae. Sacculus knife-shaped. Posterior margin of vinculum medially with small incision. Saccus broad at base, gradually tapering. Uncus narrow.

Female genitalia (Fig. 19). Eighth segment with pair of long digitate processes ventrally, ventral zone with large ovate sclerotization. Antrum short, funnel-shaped, indented. Signum with short, stout hook.

**Remarks.** *C. proximum* is similar to *junctella*, *alsinella* and *blandulella* externally. It differs from *junctella* in the colour of the head and thorax, from British *blandulella* in the extent of dark fuscous scales and the broad black patch at  $\frac{1}{4}$ , a marking in which it also differs from *alsinella*. The male genitalia are similar to those of *blandella* although they may be distinguished by the distinctly shorter and more slender valva and the narrower uncus as well as by the shape of the saccus. The female genitalia differ from those of *blandulella* in the ovate ventromedial plate of the eighth segment.

**Biology.** According to Bradford (1979) the larva occurs in May and feeds on the flowers and seeds of *Cerastium fontanum* Baumg. On the Continent it has also been bred from *Stellaria media* (L.) Vill. (Karsholt, 1981). Records of *Cerastium semidecandrum* L. as a host-plant (Stainton, 1867) refer to *alsinella*. Moths have been collected from late June to the middle of September, frequently during August. Most specimens have been collected near open grassland flying around hawthorn hedges.

Local in England and Wales to Durham. Abroad in Europe, except the south-west, Scandinavia, USA.

*Caryocolum blandulella* (Tutt, 1887), Plate V, Fig. 20

Wingspan 8.5–11 mm. Head, thorax and tegulae white flecked with a few mid-brown scales. Forewing whitish mottled with grey-brown, particularly along costa and dorsal margin; black markings: broad patch from fold to costa at  $\frac{1}{4}$ , spots at  $\frac{2}{5}$ ,  $\frac{3}{5}$ , the latter, occasionally comma-shaped spot is sometimes extended towards tornus; black patch apically; white costal and tornal spots at  $\frac{4}{5}$  forming indistinct fascia.

Male genitalia (Fig. 8). Transtilla with numerous minute spines. Valva short, without distal bulge, apical brush of setae present. Sacculus short, broad, with pointed apex. Posterior margin of vinculum with V-shaped emargination. Saccus broad at base, gradually tapering.



Female genitalia (Fig. 20). Eighth segment with pair of digitate, flap-like processes ventrally, ventral zone membranous. Antrum a short funnel. Signum with moderately short hook.

Remarks. Specimens from the Danish islands and the Swedish island of Öland are characterized by distinctly darker forewings which are covered by numerous fuscous-tipped scales. This form is not known from Britain. *C. blandulella* is similar to *blandella* externally but differs in its smaller size. It is distinguishable from *proximum* by the smaller black patch at  $\frac{1}{4}$  and the paler forewing. The female genitalia are similar to those of *proximum* but differ in the membranous ventromedial zone of the eighth segment.

Biology. The larva has been found feeding on *Cerastium semidecandrum* L. in Britain (Agassiz, pers. comm.). Benander (1965) records the caterpillar in the seed capsule of *Cerastium pumilum* Curt. in Sweden. Moths occur from the middle of July to late August, particularly along sandy coasts.

Very local in Britain, being known only from two localities in Kent and Hampshire. Abroad throughout central Europe to Greece.

*Caryocolum tricolorella* (Haworth, 1812), Plate V, Fig. 21  
*contigua* (Haworth, 1828)

Wingspan 12–14.5 mm. Head dark grey-brown, face white. Thorax and tegulae grey-brown, mesoscutellum lightened. Forewing: basal quarter and dorsal margin orange-brown, flecked with white; third quarter with irregular orange-brown patch, white costal and tornal spots at  $\frac{4}{5}$ , broad black patch from fold to costa at  $\frac{1}{4}$ , and apex.

Male genitalia (Fig. 9). Transtilla with minute spines. Valva long, slender, slightly broadened distally with apical brush of setae. Saccus knife-shaped, pointed. Vinculum with almost straight posterior margin, small incision developed. Saccus stout, gradually tapering.

Female genitalia (Fig. 21). Eighth segment with pair of small flaps dorsally, ventral zone with numerous microtrichia. Antrum moderately short, funnel-shaped. Signum with large hook.

Remarks. *C. tricolorella* usually differs from the other British *Caryocolum* species in the three-coloured forewing pattern.

Biology. The young larva makes a gallery-like mine in a leaf of *Stellaria holostea* L. In Britain it occurs from December onwards; later it feeds in a spun terminal shoot. It is fully grown about mid-April (Stainton, 1867). Sorhagen (1886) gives *Stellaria uliginosa* Murray (= *S. alsine*) as an additional host-plant on the Continent. Moths have been collected from June to mid-September.

Local in England and Wales. Abroad in Europe, except the south-west.

*Caryocolum junctella* (Douglas, 1851), Plate V, Fig. 22

Wingspan 9.5–11 mm. Head, thorax and tegulae dark grey-brown metallic, face silvery shiny. Forewing whitish mottled with grey-brown, particularly across wing at  $\frac{1}{5}$ ,  $\frac{1}{2}$  and along dorsal margin; black markings: patch from fold to costa at  $\frac{1}{4}$ , stripe distad of cell extending towards tornus, apical dot; orange-brown patch distad of cell, scales along fold; indistinct white fascia at  $\frac{4}{5}$  occasionally interrupted.

Male genitalia (Fig. 10). Transtilla with numerous spines. Valva slender, slightly broadened distally with apical brush of setae. Saccus with hook-shaped apex. Vinculum short, straight posterior margin slightly incised medially.

Female genitalia (Fig. 22). Eighth segment short, pair of dorsal flaps developed, ventral zone with numerous microtrichia. Antrum long, tubular. Signum with very long hook, some short teeth basally.

Remarks. *C. junctella* differs from similar species like *blandulella*, *proximum* and *alsinella* in the metallic shiny neck and the pale frons. Additionally it is recognizable by the distinct orange-brown patch of the forewing.

Biology. The life history in Britain is not yet known. In Sweden the larva has been found on *Cerastium arvense* L. (Benander, 1928), in China on *C. pauciflorum* (Liu & Pai, 1979). The larval stage has also been noted from *Stellaria* (Klimesch, 1954). As far as is known, *junctella* is the only *Caryocolum* species which hibernates as an adult. Moths have been collected in April/May and in July/August.

Local and scarce in north-west England, Scotland and Kent. Abroad in Europe, China and Japan.

*Caryocolum huebneri* (Haworth, 1828), Plate V, Fig. 24  
*knaggsiella* (Stainton, 1866)

Wingspan 9–12.5 mm. Head, thorax and tegulae mid- to dark-brown mottled with white, face white. Forewing mid-brown mixed with whitish, light brown, orange-brown; black markings: broken fascia from fold to costa at  $\frac{1}{4}$ , medial spots at  $\frac{1}{2}$ ,  $\frac{3}{5}$ , the latter extending towards tornus; apex dark fuscous; white costal and tornal spots at  $\frac{4}{5}$  usually separate.

Male genitalia (Fig. 11). Tegumen with long lateral process; spines of transtilla almost completely reduced. Valva thumb-shaped. Sacculus short, almost triangular. Posterior margin of vinculum with broad V-shaped emargination. Saccus extremely broad, distally rounded.

Female genitalia (Fig. 23). Eighth segment with pair of flap-like ventromedial processes. Antrum tubular, moderately short. Signum with short, slightly bent hook.

Remarks. *C. huebneri* closely resembles *kroesmanniella* externally. It differs mainly in the smaller wingspan (9–12.5 mm compared with 12.5–15 mm in *kroesmanniella*) and the mottling of the thorax and forewing.

Biology. According to Bradford (1979) the larva has been found in May, feeding between spun shoots of *Stellaria holostea* L. Moths have been collected from the middle of July to late August, bred material dates from mid-June to late July.

Scarce and local in Britain, being recorded only from Surrey and west Kent. Abroad in Europe, except the south-west.

*Caryocolum kroesmanniella* (Herrich-Schäffer, 1854), Plate V, Fig. 23

Wingspan 12.5–15 mm. Head, thorax and tegulae whitish mottled with grey-brown and orange-brown. Forewing whitish mottled with light brown, orange-brown; black markings: broken fascia from fold to costa at  $\frac{1}{4}$ , medial spots at  $\frac{1}{2}$ ,  $\frac{3}{5}$ , the latter extending towards dark brown tornus; apex with a few black spots; indistinct white fascia at  $\frac{7}{8}$ .

Male genitalia (Fig. 12). Tegumen with long lateral process; spines of transtilla almost completely reduced. Valva and sacculus slender, digitate. Posterior margin of vinculum with extremely broad rectangular emargination, large triangular process laterally. Saccus extremely broad, hardly narrowing distally.

Female genitalia (Fig. 24). Eighth segment with pair of drop-shaped processes dorsally, ventral zone membranous. Antrum long, funnel-shaped with a few microtrichia medially. Signum a small plate, without hook.

Remarks. This species exhibits considerable variation in the composition of the forewing colour. It is very similar to *huebneri* externally but differs in the large size and the usually paler forewing with less contrasting markings. *C. kroesmanniella* differs from the occasionally similar *blandella* in the interrupted fascia at  $\frac{1}{4}$ .

Biology. The larva starts feeding as a leaf-miner in the autumn. After hibernation it lives in spun shoots until May (Benander, 1965). It usually feeds on *Stellaria holostea*



L. but has also been found on *S. uliginosa* Murray (= *S. alsine*) (Klimesch, 1954) and *S. media* (L.) Vill. (Süssner, 1966) on the Continent. Moths have been caught in open woodland from early July to the beginning of September.

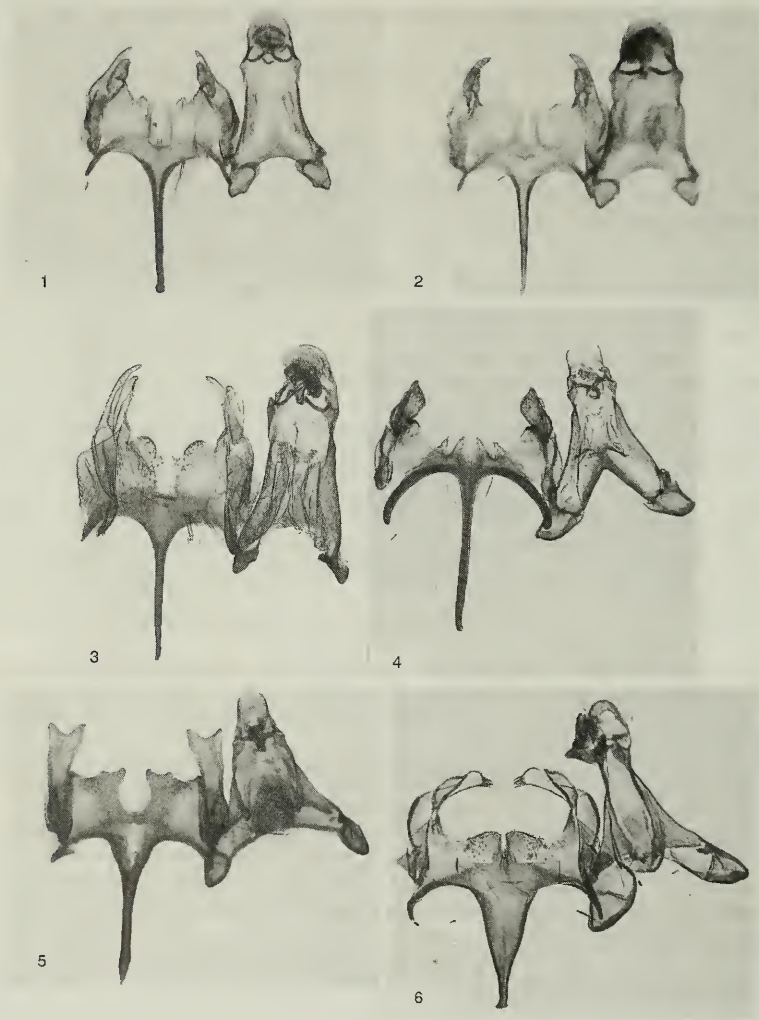
Scarce and local in England north of Gloucestershire. Abroad in Europe, except the southern part.

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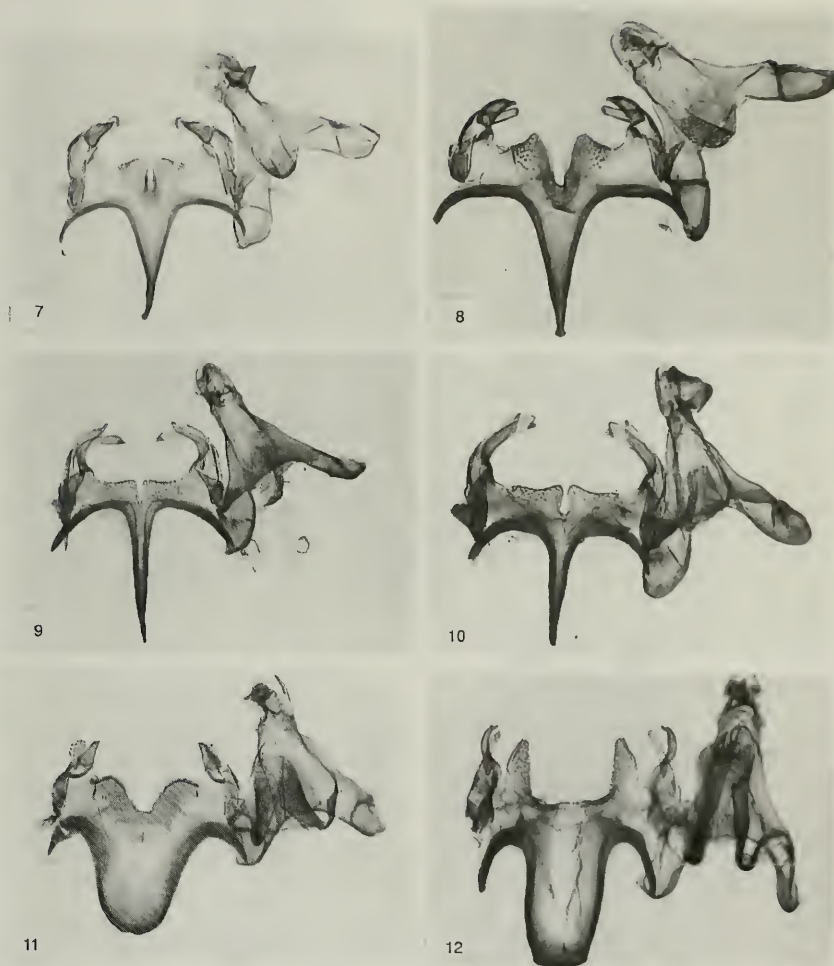
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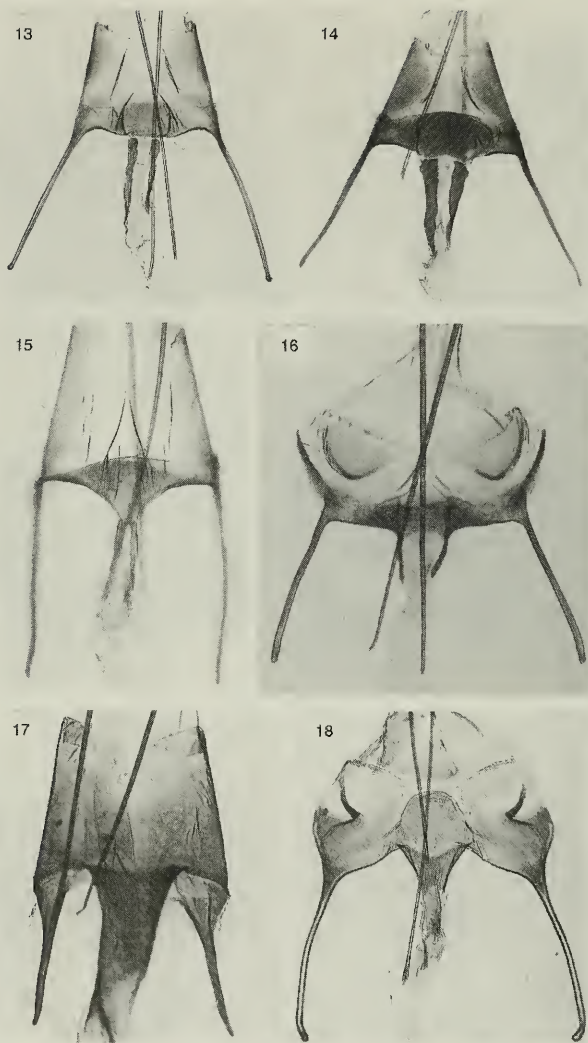


Figs 1-6. Male genitalia of British *Caryocolum* species. 1: *C. alsinella*, 2: *C. viscariella*, 3: *C. vicinella*, 4: *C. marmoreum*, 5: *C. fraternella*, 6: *C. blandella*.

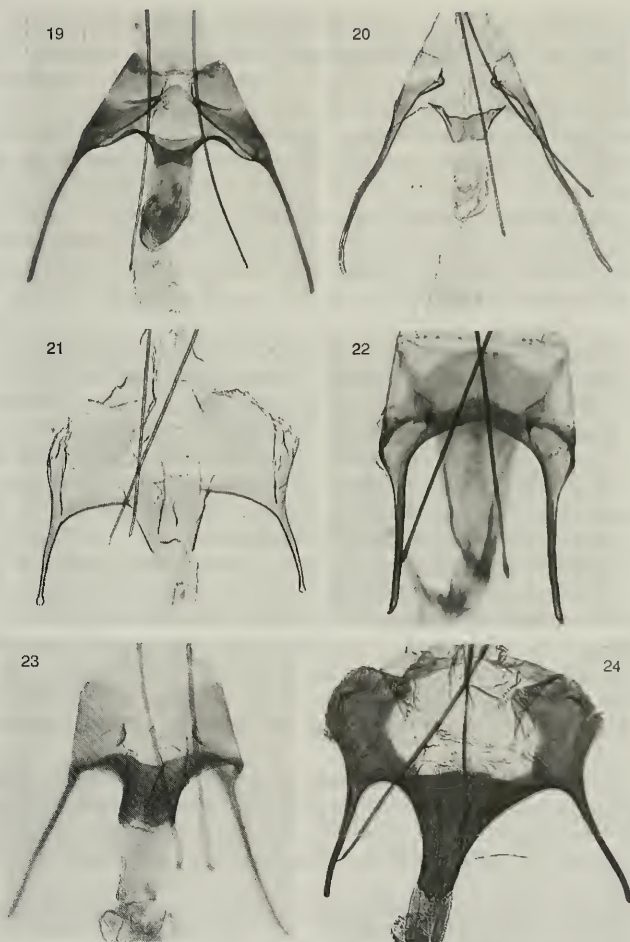


Figs 7-12. Male genitalia of British *Caryocolum* species. 7: *C. proximum*, 8: *C. blandulella*, 9: *C. tricolorella*, 10: *C. junctella*, 11: *C. huebneri*, 12: *C. kroesmanniella*.





Figs 13–18. Female genitalia of British *Caryocolum* species. 13: *C. alsinella*, 14: *C. viscariella*, 15: *C. vicinella*, 16: *C. marmoreum*, 17: *C. fraternella*, 18: *C. blandella*.



Figs 19–24. Female genitalia of British *Caryocolum* species. 19: *C. proximum*, 20: *C. blandulella*, 21: *C. tricolorella*, 22: *C. junctella*, 23: *C. huebneri*, 24: *C. kroesmanniella*.